

now, under the same conditions of seeing in which the rings appear continuous—their real form—in the smaller glass, the aperture be increased, the rings will be seen to break up into detached masses. It is very rare that they ever appear otherwise in a very large glass, for the seeing is almost never good enough thus to show them, accuracy of definition demanding much better air for a large than for a small aperture.

Now what happens to the lines of the image of a star—for the rings are simply circular lines—must happen in the same manner to planetary lines. They too must break up into a mosaic in a large glass whenever the rings do. This shows that planetary lines would necessarily assume a mosaic in a large glass contrary to their true form of continuous linearity.

PERCIVAL LOWELL.

Lowell Observatory, Flagstaff, Arizona.

Colour-blindness.

IN the summary of the case of Mr. John Trattles published in NATURE of January 27 the expression is used:—"Dr. Ettles, who had examined Mr. Trattles, and was of opinion that he was not colour-blind, was also present."

That is only relatively accurate, and it is in the reservation that the real point lies. I examined Mr. Trattles on May 10, 11, and 12 last year. His spectrum range included both B and H lines—actually, 0.75μ in the red to 0.39μ in the violet. His sense of colour was less good about 0.54μ than in the rest of the spectrum. Indeed, it was what one might call "bad." It was the presence of this defect which caused him to give such contradictory replies at Sir Wm. Abney's examination. My certificate, which was read in the House of Lords by Lord Muskerry in the debate referred to, viz. June 30, 1909, expressly stated that Trattles was competent to navigate a ship. It did not state that his colour vision was in all respects perfect.

Sir Wm. Abney and those associated with him concluded that, as the result of their tests, Trattles was "completely red-blind." I saw in those tests simply a confirmation of my own conclusions. We were at one in the symptoms, but we strongly differ in the diagnosis. If the Board of Trade starboard light were a yellow-green, Trattles would be unfit; but it is a blue-green, and he sees it perfectly.

As to red, he is anything but scoterythrous; that is what comes of being obsessed with a colour-vision theory.

One other point, the "recondite test of simultaneous contrast colours" is very much open to criticism. A simultaneous colour contrast is not a "colour" in the ordinary sense; it possesses no dominant wave-length; it is an optical illusion. Is an optical illusion so accepted and clear a test that it may be used as a touchstone to determine whether a man's career shall be ruined or not?

WILLIAM ETTLES.

34 Wimpole Street, Cavendish Square, W.,
January 30.

WE regret that we were in error in stating that Dr. Ettles was of opinion that Mr. Trattles was not colour-blind. It is interesting to know that he found the colour vision "less good" at a point in the spectrum not far removed from the region where the so-called "red-blind" person has a so-called "neutral band." The accurate determination of the spectrum range and of the deviations from the normal within that range constitutes the fundamental problem in discriminating colour-blindness. The accuracy of the determination, however, depends upon the methods adopted and the precision of the application of these methods.

With regard to the simultaneous contrast test, Dr. Ettles states that it is an optical illusion. If this be admitted, it is constant in its character in all normal individuals; hence any deviation may be fairly regarded as indicating a pathological condition of colour vision. As physiologists we cannot admit as a valid argument against the test that it is difficult or impossible satisfactorily to correlate the physical facts with the physiological manifestations.

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But is it necessary or advisable that the divergence of opinion on the exact conditions of Mr. Trattles's colour vision should be further emphasised? The case has been adjudicated upon, and has amply demonstrated the need of reform either in the tests or in the application of the tests. The Board of Trade cannot, and ought not, to accept any risk of allowing a man with possibly dangerous defective colour vision to pass the examination. It is better that slight hardship should fall upon a few individuals than that many lives should be endangered; but the hardship must be minimised, and this object will be best attained by ensuring that the individuals shall be eliminated as early as possible in their careers. Hence it is of the utmost importance that the first examination shall be authoritative and conclusive.

THE WRITER OF THE ARTICLE.

Records of the Earthquake of January 22.

ON January 22 the Kew Milne horizontal pendulum recorded a large earthquake, of which the preliminary tremors commenced at about 8h. 52.6m. a.m., and the large waves at about 8h. 56.1m. The limits of registration, 17 mm., were exceeded between 8h. 58m. and 8h. 59m., and again at 9h. 0.4m. Synchronous with both maxima there were burrs on the magnetic declination trace. The largest, which simulated an oscillation of $1.5'$ in declination, commenced about 8h. 57m., and lasted about five minutes. The movements on the declination trace were unquestionably seismic in character, and represented the mechanical effect of the principal earth tremors. The horizontal and vertical force traces were not sensibly affected.

CHARLES CHREE.

The National Physical Laboratory (Kew Observatory Department), Richmond, Surrey, January 27.

An Earthquake Phenomenon.

A CURIOUS phenomenon connected with the earthquake of January 22 was that the maximum movement was accompanied by a sudden tilt. The amount of this was approximately one second of arc, its direction being towards the north-west. This would correspond to a rise of the ground on the south-east. It took place at about 8 a.m., when the booms of five horizontal pendulums were suddenly displaced from their normal position. Those oriented east and west were swung to the north, whilst those at right angles moved to the west. Pendulums in rooms 80 yards apart were displaced similarly. From 12.45 they crept back somewhat intermittently towards their original position, which they reached about 4 p.m.

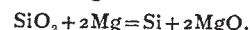
Whether this indicates a local change in the dip of the strata (chalk) on which my instruments are founded or a more extended change of level cannot be stated with any certainty. At Bidston a pendulum oriented east-west was displaced towards the north, and at West Bromwich a pair of pendulums swung more on one side of their normal position than on the other. Their behaviour suggested a displacement similar to that observed at Shide. Permanent changes in the ground near the origin of a large earthquake are common.

J. MILNE.

Shide, Isle of Wight.

The Preparation of Silicon. A Warning.

A COMMON method of preparing silicon is by mixing silica and magnesium powder in molecular proportions and heating until the following reaction takes place:—



The majority of text-books recommend the use of silica in the form of silver sand or ground quartz, but they do not say it is absolutely necessary, or even desirable, that it should be in this form, and one well-known treatise states that precipitated silica and pure magnesium powder will yield very pure silicon. This authority adds that if the experiment is performed with precipitated silica the reaction is attended by a brilliant flash of light.

Having recently had occasion to prepare some silicon, precipitated silica was heated with magnesium powder in a Hessian crucible. One quarter gram-molecule of each was employed. The heating had proceeded some little time when suddenly the mixture exploded with terrific violence, shattering the crucible to a powder and sending out a great sheet of white flame. So great was the force of the explosion that the iron ring of the retort stand which held the crucible was bent out of shape. On examination it was found that the ingredients were pure, except that they might not have been quite free from moisture.

What I wish particularly to point out is that there is not a word in any of the text-books I have referred to of the danger of a very serious explosion in the above preparation.

Perhaps someone can say, definitely, whether the presence of a trace of water will cause such a mixture to explode on heating.

F. H. POWER.

Lincoln Grove, Radcliffe-on-Trent, Notts,
January 26.

Intermittent Glow of the Tail of the New Comet.

IN Mr. Rolston's interesting and valuable article on the new comet (NATURE, January 27) reference is made to the statement of the Rev. F. J. Jervis-Smith that several persons observing at Lymington on January 22 thought the tail appeared to flash slightly and continuously.

Now, on the evening of that day I got the impression, on seeing the comet setting in the west-south-west, that there was an intermittent glow of the tail matter, in no very marked degree, it is true, but still there was a seeming perceptibility.

Later that evening I was told by an unskilled observer that he had seen "faint lights issue from the head and pass up to the end of the tail."

The conclusion I came to at the time exactly coincides with that referred to in the article, which is that the appearance was referable to the low position of the object and consequent atmospheric effects.

The interposition between the observer and the tail of a slight cloud or of some distant mass of smoke, though in itself too filmy to be noticed from afar off against a dark sky, would, doubtless, account for these light changes.

A correspondent once wrote to me—in some alarm, I thought—that Jupiter had on the previous evening behaved in a manner which was, to say the least, extraordinary, in that it had "kept going in and out" for five minutes on end. As the planet was then low in the sky, I concluded that the effect described by my perturbed correspondent was due to rapidly moving patches of unseen denser vapour than that which surrounded the planet, intruding in the line of sight. At the same time, I was far from being unmindful of the way in which Jupiter's light will frequently palpitate when the planet is nearing the horizon.

J. H. ELGIE.

72 Grange Avenue, Leeds, January 28.

Unemployed Laboratory Assistants.

A NUMBER of lads who have been employed as laboratory monitors in secondary schools, and whom the London County Council are unable to retain in their service beyond the age of sixteen years, have been referred to us by the London County Council with the view of our placing them. Some of them we have already been able to place in suitable employment, but there are still one or two on our books for whom we seek situations.

They all have an elementary knowledge of physics and chemistry. Some have learned glass-blowing and bending, and one of the applicants has already passed the Board of Education examination in chemistry (Stage I.). If any readers of NATURE would like to have further particulars of these boys, I should be glad to supply them with information.

GODFREY REISS (*Hon. Sec.*).

Apprenticeship and Skilled Employment Association,
36 Denison House, 296 Vauxhall Bridge Road,
London, S.W., January 31.

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THE AROLLA PINE.¹

THE Arve or Arolla pine is the most beautiful of Alpine conifers. The glossy green of its acicular tufted leaves, the curving cone of its outline, the combined strength and grace of its growth, make it yet more attractive in colour and in form than the darker and sturdier spruce. It ranges, though rather fitful and sporadic in distribution, throughout the Alpine chain, passing on to the Carpathians, where, however, it does not grow nearly so high above the sea-level, but it is most abundant in north-eastern Asia, which is apparently its birthplace. There it extends northward to the tree-limit, eastward to the Altai, the Sea of Okhotsk, and the north of Japan, and westward even so far as the Lower Dwina. Between the occupants of these two provinces some marked differences exist, so that Dr. Rikli recognises an Arctic and an Alpine subspecies, to the latter of which his memoir is re-



FIG. 1.—The Arve in Youth.

stricted. The Arve is a lover of the mountains, and on these it has a rather wide vertical range. When growing wild it is seldom met with below the 1350-metre contour-line. Dr. Rikli mentions as the lowest instance one at about 1200, near Raron, in the Upper Rhone valley. Its upper limit is about 2400 metres, the highest occurrence on record being 2585 metres, on the Plattje, near Saas Fee. Such cases, however, are exceptional, where the tree obviously has had a hard struggle for existence, and it cannot be said to flourish above 2300 metres. On the Northern range of the Alps, the vertical limits within which it grows freely are narrower than in the Central—or Pennine and Lepontine—range, the difference between them, in

¹ Die Arve in der Schweiz. Ein Beitrag zur Waldgeschichte und Waldbirtschaft der Schweizer Alpen von Dr. M. Rikli. Mit einer Arvenkarte der Schweiz, einer Waldkarte von Davos, 19 Spezialkarten in Lithographie, 9 Tafeln in Lichtdruck und 51 Textbildern. (Neue Denkschriften der Schweizerischen Naturforschenden Gesellschaft, Band xlv.) Pp. xl+455. (Basel: Georg & Cie.; Zürich: Zürcher & Furrer, 1909.)